

REMARKS/ARGUMENTS

Claims 1-44 remain in the application, all of which stand rejected.

Claim 21 has been amended to reiterate that which is recited in the preamble of the claim in the body of the claim. This amendment is not believed to introduce new matter.

1. Objection to the Drawings

The drawings stand objected to as failing to comply with 37 CFR 1.84(p)(5). More specifically, the Examiner asserts that the drawings contain reference numbers 300 and 712, but these reference numbers are not mentioned in the specification.

In response, applicant has amended paragraph [0033] to reference "flow chart 300" of FIGURE 3. Applicant has also amended paragraph [0062] to indicate that "the terrace half-width ("h") is set to half of the terrace diameter 712." Neither of these amendments is believed to introduce new matter.

2. Rejection of Claims 1-5 and 12 Under 35 USC 102(b)

Claims 1-5 and 12 stand rejected under 35 USC 102(b) as being anticipated by Lee et al. (DULLRAZOR®: "A Software Approach to Hair Removal from Images"; hereinafter "Lee").

With respect to claim 1, the Examiner asserts that Lee teaches:

... a method for deshadowing a laminographic image comprising: constructing one or more morphological filters using expected sizes of the objects to be imaged (page 536, lines 6-8, i.e. three filter structures based on object thickness and orientation); and applying said filters to a laminographic image including images of said objects (page 536, lines 3-4).

8/7/2007 Office Action, p. 3, sec. 3.

Applicant respectfully disagrees. To anticipate a claim, a reference must show each and every feature of the claim. At a minimum, Lee does not disclose the construction of one or more morphological filters *"using expected sizes of the objects to be imaged"*. Although the Examiner seems to assert that constructing a morphological filter based on "object thickness" is equivalent to constructing a morphological filter based on object size, applicant notes that Lee does not disclose the construction of one or more morphological filters based on *object thickness*. That is, Lee's page 536, lines 6-8, state:

... Experimental results suggest that three structure elements at different directions, 0° (horizontal), 45° (diagonal), and 90° (vertical) as illustrated in Fig. 3, are adequate to smooth out all the black hairs...

Nothing in the above excerpt teaches or suggests the construction of one or more morphological filters based on object thickness. Nor does any other portion of Lee teach construction of one or more morphological filters based on object thickness. And, although the structure elements shown in Lee's Fig. 3 (page 535) have dimensions, Lee never indicates that these dimensions (nor anything else about the structure elements) are based on "expected sizes of... objects to be imaged".

Not only does Lee fail to teach constructing one or more morphological filters using expected sizes of objects to be imaged, but Lee also fails to teach 1) the application of morphological filters to a "laminographic image", or 2) "deshadowing" of a laminographic image.

Claim 1 is believed to be allowable over Lee's teachings for at least the above reasons.

Claims 2-5 and 12 are believed to be allowable over Lee's teachings, at least, because they depend from claim 1.

3. Rejection of Claims 21, 23 and 25 Under 35 USC 102(b)

Claims 21, 23 and 25 stand rejected under 35 USC 102(b) as being anticipated by Loce et al. (US 6,297,889; hereinafter "Loce").

With respect to claim 21, the Examiner asserts that Loce teaches:

... selecting a mathematical morphology structuring element larger than examination elements of a laminographic image to be inspected (Column 8, lines 62-63, i.e. structuring element K1 (Fig. 7) larger than examination element (i.e. hole, column 7, lines 57-58)); performing a mathematical morphological operation on said image (column 8, lines 63-64); and differentiating, after performance of said mathematical morphological operation, a background of said image from said examination elements to remove said background (column 8, lines 63-64).

8/7/2007 Office Action, p. 4, sec. 4.

Applicant respectfully disagrees. To begin, Loce does not teach a method for deshadowing a laminographic image. In fact, the primary focus of Loce's teachings are directed to methods for eliminating blooming. See, e.g., Loce's Abstract, which states:

A method for processing digital images to be displayed, stored, or printed, to eliminate blooming and other artifacts. The system utilizes morphological processes to isolate and modify image structures susceptible to marking process artifacts and then combines the modified image structures with the input image to produce a printable image that may be rendered on a given printer.

Loce further states:

... Blooming causes "holes" within a latent image to fill in with toner, which in turn results in the loss of shadow detail in halftoned images.

Loce, col. 3, lines 17-19.

Thus, it seems to applicant that a primary goal of Loce's methods is to preserve shadow detail in an image, rather than to "deshadow" an image as recited in applicant's claim 21.

Applicant will refer now to the excerpts of Loce referenced by the Examiner, which are reproduced below:

... For example, a morphological operation may be employed to identify single-pixel holes within an image...

Loce, col. 7, lines 57-58.

... K_1 is the structure used with the close operation to isolate holes, as represented logically by the equation $A \bullet K_1) \Delta A$...

Loce, col. 8, lines 62-64.

The structure element K_1 is shown in Loce's FIG. 7, and it would appear to comprise more pixels than one, which is why the Examiner asserts the structure element K_1 is larger than the single-pixel hole mentioned in Loce's col. 7, lines 57-58. However, applicant asserts that the Examiner's inference is not supported by Loce's teachings. That is, Loce's col. 8, lines 62-64, only indicate the K_1 structure element can be used to isolate "holes". Col. 8, lines 62-64, do not specifically indicate that these "holes" are the "single-pixel holes" mentioned in col. 7, lines 57-58. In fact, applicant believes the structure element K_1 is not used to isolate single-pixel holes, because Loce later teaches:

... The ideas described above naturally extend to implementations on gray-scale images via use of gray-scale morphological operators. For instance, a hole in a binary image is defined as a small region of zero-valued pixels surrounded by one-values pixels. A structuring element that finds such a hole is of comparable size and is valued one or zero. For a gray-scale image, a hole may be a small region of low pixel values in a field of pixels processing higher values. Gray-scale structuring elements would possess a comparable gray-range to the input data and be of comparable size.

Loce, col. 9, line 60 - col. 10, line 3.

Applicant does not believe "comparable size" reads on "larger", and thus, applicant believes the Examiner's inference that the structure element K_1 (Fig. 7) would be used to eliminate single-pixel holes is incorrect.

Claim 21 is believed to be allowable over Loce's teachings for at least the above reasons.

Claims 23 and 25 are believed to be allowable over Loce's teachings, at least, because they depend from claim 21.

4. Rejection of Claims 41-43 Under 35 USC 102(b)

Claims 41-43 stand rejected under 35 USC 102(b) as being anticipated by Shih et al. ("Decomposition of Geometric-Shaped Structuring Elements using Morphological Transformations on Binary Images"; hereinafter "Shih").

With respect to claim 41, the Examiner indicates that Shih teaches a method for performing mathematical morphology by varying the radii and slopes of successively applied structuring elements. However, the Examiner does not indicate where Shih teaches "selecting an ultimate mathematical morphology structuring element radius larger than examination elements of a laminographic image to be inspected". Although the Examiner asserts that this is taught by Shih on page 357, equation 5, wherein Shih sets a radius "i" equal to "n", there is no indication by Shih that "n" is set "larger than examination elements of a laminographic image to be inspected".

Claim 41 is believed to be allowable over Shih's teachings for at least the above reasons.

Claims 42 and 43 are believed to be allowable over Shih's teachings, at least, because they depend from claim 41.

5. Rejection of Claims 6-8 Under 35 USC 103(a)

Claims 6-8 stand rejected under 35 USC 103(a) as being unpatentable over Lee in view of Segall et al. ("Video Tracing using Morphological Pyramids"; hereinafter "Segall").

Claims 6-8 are believed to be allowable, at least, because 1) they depend from claim 1, and 2) Segall does not teach that which is missing from Lee. See, e.g., applicant's discussion of Lee in section 2 of these Remarks/Arguments.

6. Rejection of Claims 9-11 and 15-17 Under 35 USC 103(a)

Claims 9-11 and 15-17 stand rejected under 35 USC 103(a) as being unpatentable over Lee in view of Shih.

Claims 9-11 and 15-17 are believed to be allowable, at least, because 1) they depend from claim 1, and 2) Shih does not teach that which is missing from Lee. See, e.g., applicant's discussions of Lee and Shih in sections 2 and 4 of these Remarks/Arguments.

7. Rejection of Claims 18-20 Under 35 USC 103(a)

Claims 18-20 stand rejected under 35 USC 103(a) as being unpatentable over Lee in view of Fujii et al. (US 5,594,768; hereinafter "Fujii").

Claims 18-20 are believed to be allowable, at least, because 1) they depend from claim 1, and 2) Fujii does not teach that which is missing from Lee. See, e.g., applicant's discussion of Lee in section 2 of these Remarks/Arguments.

8. Rejection of Claim 13 Under 35 USC 103(a)

Claim 13 stands rejected under 35 USC 103(a) as being unpatentable over Lee in view of Cline (US 6,058,218).

Claim 13 is believed to be allowable, at least, because 1) it depends from claim 1, and 2) Cline does not teach that which is missing from Lee. See, e.g., applicant's discussion of Lee in section 2 of these Remarks/Arguments.

9. Rejection of Claim 14 Under 35 USC 103(a)

Claim 14 stands rejected under 35 USC 103(a) as being unpatentable over Lee in view of Loce.

Claim 14 is believed to be allowable, at least, because 1) it depends from claim 1, and 2) Loce does not teach that which is missing from Lee. See, e.g., applicant's discussions of Lee and Loce in sections 2 and 3 of these Remarks/Arguments.

10. Rejection of Claims 22 and 24 Under 35 USC 103(a)

Claims 22 and 24 stand rejected under 35 USC 103(a) as being unpatentable over Loce in view of Cline.

Claims 22 and 24 are believed to be allowable, at least, because 1) they depend from claim 21, and 2) Cline does not teach that which is missing from Loce. See, e.g., applicant's discussion of Loce in section 3 of these Remarks/Arguments.

11. Rejection of Claims 26 and 27 Under 35 USC 103(a)

Claims 26 and 27 stand rejected under 35 USC 103(a) as being unpatentable over Loce in view of Cline and Segall.

Claims 26 and 27 are believed to be allowable, at least, because 1) they depend from claim 21, and 2) Cline and Segall do not teach that which is missing from Loce. See, e.g., applicant's discussion of Loce in section 3 of these Remarks/Arguments.

12. Rejection of Claims 28 and 35 Under 35 USC 103(a)

Claims 28 and 35 stand rejected under 35 USC 103(a) as being unpatentable over Loce in view of Segall.

Claims 28 and 35 are believed to be allowable, at least, because 1) they depend from claim 21, and 2) Segall does not teach that which is missing from Loce. See, e.g., applicant's discussion of Loce in section 3 of these Remarks/Arguments.

13. Rejection of Claims 29-31, 33 and 34 Under 35 USC 103(a)

Claims 29-31, 33 and 34 stand rejected under 35 USC 103(a) as being unpatentable over Loce in view of Cline and Shih.

Claims 29-31, 33 and 34 are believed to be allowable, at least, because 1) they depend from claim 21, and 2) Cline and Shih do not teach that which is missing from Loce. See, e.g., applicant's discussion of Loce and Shih in sections 3 and 4 of these Remarks/Arguments.

14. Rejection of Claim 32 Under 35 USC 103(a)

Claim 32 stands rejected under 35 USC 103(a) as being unpatentable over Loce in view of Shih.

Claim 32 is believed to be allowable, at least, because 1) it depends from claim 21, and 2) Shih does not teach that which is missing from Loce. See, e.g., applicant's discussions of Loce and Shih in sections 3 and 4 of these Remarks/Arguments.

15. Rejection of Claims 36 and 37 Under 35 USC 103(a)

Claims 36 and 37 stand rejected under 35 USC 103(a) as being unpatentable over Loce in view of Lee.

Claims 36 and 37 are believed to be allowable, at least, because 1) they depend from claim 21, and 2) Lee does not teach that which is missing from Loce. See, e.g., applicant's discussions of Lee and Loce in sections 2 and 3 of these Remarks/Arguments.

16. Rejection of Claims 38-40 Under 35 USC 103(a)

Claims 38-40 stand rejected under 35 USC 103(a) as being unpatentable over Loce in view of Fujii.

Claims 38-40 are believed to be allowable, at least, because 1) they depend from claim 21, and 2) Fujii does not teach that which is missing from Loce. See, e.g., applicant's discussion of Loce in section 3 of these Remarks/Arguments.

17. Rejection of Claim 44 Under 35 USC 103(a)


Claim 44 stands rejected under 35 USC 103(a) as being unpatentable over Shih in view of Loce.

Claim 44 is believed to be allowable, at least, because 1) it depends from claim 41, and 2) Loce does not teach that which is missing from Shih. See, e.g., applicant's discussion of Loce and Shih in sections 3 and 4 of these Remarks/Arguments.

18. Conclusion

In light of the amendments and remarks provided herein, applicant respectfully requests the issuance of a Notice of Allowance.

Respectfully submitted,
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